MANUEL D'ENTRETIEN DU

POTTIER P230S PANDA

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REPERTOIRE DES EVOLUTIONS			
EDITION	DATE	Nature de l'évolution	Pages modifiées
A	Date d'émission	Emission initiale	
B			

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2 Prolégomènes

2.1 Avertissement

Cette publication contient des informations nécessaires pour réaliser la maintenance et les visites 50 et 100 heures du Pottier P230S PANDA équipé d'un moteur IO240B.

Ce document est édité à titre informatif et n'est en aucun cas un document officiel et ne peut suffire à lui seul pour maintenir l'aptitude de navigabilité de l'aéronef.

2.2 Evolutions

Ce document est appelé à s'enrichir jour après jour d'éléments nouveaux, il est donc publié ici en temps que projet.

3 Programme d'inspection

3.1 Echelonnement des visites

L'échelonnement des visites est défini en termes d'heure de fonctionnement réelles ou de dates calendaires

- Visite 50 h ou 6 mois tolérance 10 h ou 1 mois
- Visite 100 h ou 1 ans tolérance 10 h ou 1 mois
- Visite 100 h et 2 ans tolérance 10 h ou 3 mois
- Visite 100 h et 4 ans

Les inspections triennales pour le renouvellement du CNRA viennent en supplément des visites.

Chaque visite fait l'objet d'un compte rendu succinct dont un modèle est fournis en annexe.

Ces CR sont archivés par le propriétaire de l'aéronef pendant une durée de cinq ans.

3.2 Tenu des documents avion

Les documents avion sont :

- Le carnet de route,
- Le livret d'aéronef,
- Le livret moteur.

3.2.1 Le carnet de route

Les pilotes y notent les vols effectués et leur durée, ainsi que les anomalie de fonctionnement.

Sur le page droite, les visites sont mentionnées succinctement.

3.2.2 Le livret d'aéronef

Les pages de garde doivent être renseignées avec les organes à péremption, le moteur et l'hélice. Dans les pages suivantes, ce qui importe c'est de connaître le temps de vol cumulé avant une intervention à une date précisée.

Il est indispensable de mentionner toutes les visites et les réparations effectuées et les pièces changées.

3.2.3 Le livret moteur

Le livret se gère de la même façon que le précédent, mais le compte des heures ne concerne que les heures du moteur en cours.

4 Contenu des visites

4.1 Entretien des 25 heures

Le moteur IO240B du Panda est équipé d'un filtre tamis (« oil screen »), une vidange est nécessaire tous les 25 heures. Se conformer au chapitre 19-3 du « IO240 series Maintenance Manual » réf. TCM X30621A ou aux recommandations ci-dessous

4.1.1 25 Hour Inspection (Fuel Injected Normally Aspirated Engines)

SERVICING

SCHEDULED MAINTENANCE

Prior to any scheduled inspection the engine must be clean and a pre-inspection operational run-up performed. Record the engine operating parameters on the operational test form provided. Verify that the recorded parameters meet the published performance specifications for the engine as provided in the aircraft and/or engine manufacturers- Service, Operator-s and Overhaul Manuals.

At the completion of any maintenance event the engine must be given a complete and thorough operational run-up. In some cases where adjustments have been made to the engine fuel system and or turbocharger system a test flight will be required, reference FAR 91.407. Record all engine parameters on the operational test form and if a test flight was performed on a test flight log and verify that recorded parameters are within the specifications published for the engine and aircraft.

The scheduled maintenance listings in this program are formatted in a convenient check list form that may be printed and used during the performance of the inspections.

In addition to the items listed for pre-flight inspection, the following maintenance should be performed.

___ 1. After the first 25 hours of operation on new, rebuilt or overhauled engines perform a complete 50 hour inspection.

Drain the oil used for engine break-in. If engine oil consumption has stabilized, service the engine with an aviation grade ashless dispersant oil meeting TCM specifications, refer to the Airplane Flight Maual and/or TCM Service Bulletin M87-12 Rev.1 or latest revision for approved oils.

If oil consumption has not stabilized, service engine with a mineral oil conforming to MIL-L-6082. Additionally, notify your FBO and TCM that oil consumption has not stabilized.

___ 2. Engines equipped with integral oil screens require a complete oil change and removal, inspection and cleaning of the oil screen every 25 hours of operation.

Engines equipped with full flow oil filters as original or optional equipment by the engine or aircraft manufacturer may be operated for 50 hours between oil changes.

Note: Oil filtration systems installed via an STC must be serviced as directed by the STC holder.

Oil: First 25 hours of operation...Mineral (non-detergent) oil or Corrosion Preventive oil corresponding to MIL-C-6529 Type II.

Note: Mineral oil conforming to MIL-C-6529 Type II is a straight mineral oil with a corrosion preventive additive.

This oil must not be operated in excess of 25 hours or 6 months, whichever occurs first. If oil consumption has not stabilized within the first 25 hours of engine operation, drain and replenish the oil. Remove and clean the oil pressure screen or replace the filter.

Approved Oil Grade:

All Temperatures.....15W-50 / 20W-50 /20W-60

Below 40 F. Ambient Air (Sea Level)...SAE30 or 10W-30

Above 40 F. Ambient Air (Sea Level)...SAE50

Oil Change Interval:

With integral oil screen.....25 hours.

With small full flow oil filter.....50 hours.

With large full flow oil filter.....100 hours.

Note: Oil must be drained and replenished every six (6) months regardless of hours since last oil change.

Oil Filter Interval:

Integral oil pressure screen.....25 hours.

Small oil filter (approximately 4.80" high)...50 hours.

Large oil filter (approxiamtely 5.80" high)...50 hours.

CAUTION:

USE ONLY OIL CONFORMING TO TCM SPECIFICATIONS AFTER ENGINE BREAK-IN. REFER TO TCM SERVICE BULLETIN M87-12 REV.1 OR LATEST REVISION FOR APPROVED OILS.

___ 3 Remove and inspect induction air filter. Clean or replace as recommended by the filter manufacturer. Inspect induction system ducts, seals and gaskets for condition and deterioration. Replace as required any questionable components. Inspect

carburetor heat control valve for proper travel, freedom of movement, worn bushings and correct rigging.

___ 4. Inspect induction air box for security and deterioration. With induction air filter installed, verify that the induction air filter retainer is properly installed and the attaching hardware is secure.

Note: Failure to properly install the induction air filter retainer will result in unfiltered air being ingested into the engine which will accelerate engine wear and reduce engine service life.

___ 5 Correct any discrepancies noted.

___ 6. Perform post inspection operational run-up. Verify that the engine meets all performance criteria as detailed in Step 1, 50 hour pre-inspection operational run-up and record engine parameters on operational check list.

Visually inspect engine and nacelle for fuel and oil leaks.

___ 7 Prior to engine shut-down, perform hot magneto test.

Reference TCM Service Bulletin SB653 or latest revision for amplified instructions.

WARNING:

FAILURE TO CORRECT AN OPEN IN THE GROUNDING CIRCUIT OF THE MAGNETO(S) WILL RESULT IN THE MAGNETO(S) BEING HOT. THIS MAY RESULT IN THE ENGINE FIRING INADVERTENTLY AND RESULT IN BODILY INJURY OR DEATH FROM THE PROPELLER STRIKING AN INDIVIDUAL.

___ 8 Correct any discrepancies noted during this inspection prior to returning the engine to service.

OBSERVATIONS _____

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5 Visite des 50 heures

5.1.1 Entretien courant, graissage

Les charnières d'aileron et de volets doivent être lubrifié avec une huile fine possédant une propriété anticorrosion.

Les coulisse de commande de volet sont graissées à l'aide de graisse blonde.

5.1.2 Conditionnement d'air

Vérifier le fonctionnement des commandes de clapet, au besoin lubrifier les axes des clapets. Vérifier la fixation des gaines souples au niveau des raccordements.

5.1.3 Circuit électrique

Vérification du câblage électrique à l'avant de la cloison pare feu pour frottements et usure anormale. Vérifier le serrage des cosses électriques.

Vérifier la charge de la batterie, recharger éventuellement.

Vérifier le fonctionnement du phare d'atterrissage, des feux de navigation, des feux à éclat, de l'avertisseur de décrochage.

5.1.4 Circuit carburant

Nettoyage du pot décanteur, noter l'état, remontage : la molette de serrage du pot doit être arrêtée au fil à freiner.

Vérifier les tuyaux pour frottements, rayon de courbure et usure anormale.

5.1.5 Système de freinage

Vérifier le circuit pour fuite et dommage.

Vérifier le niveau du liquide de frein. Compléter éventuellement. Avec du liquide de frein automobile DOT4 uniquement.

5.1.6 Instrument

Rien.

5.1.7 Commandes de vol

Démonter les trappes de visite (une sous chaque aile, deux sous le fuselage), vérifier l'état des guignols, des rotules : jeux, déformations.

5.1.8 Hélice

Vérification visuelle des pales pour éclat.

Vérification du serrage de l'hélice :

Démontage du cône

Serrage des boulons de ¼" au couple de 9 à 10 foots.lbs

Serrage des boulons de ½ " au couple de

Remontage du cône.

5.1.9 Moteur

Se conformer au « IO240 series Maintenance Manual » réf. TCM X30621A

Ou aux recommandations ci-dessous :

5.1.10 50 HOUR INSPECTION (Fuel Injected Normally Aspirated Engines)

SERVICING SCHEDULED MAINTENANCE

Maximum efficiency and engine service life is predicated on compliance with the aircraft and engine manufacturer-s required published inspection and maintenance schedule. Non compliance may result in a loss of engine performance, an increase in unscheduled maintenance and a reduction in engine service life. The owner or operator is primarily responsible for maintaining the engine in an airworthy condition, including compliance with applicable Airworthiness

Prior to any scheduled inspection the engine must be clean and a pre-inspection operational run-up performed. Record the engine operating parameters on the operational test form provided. Verify that the recorded parameters meet the published performance specifications for the engine as provided in the aircraft and/or engine- s manufacturers- Service, Operator-s and Overhaul Manuals. At the completion of any maintenance event the engine must be given a complete and thorough operational run-up.

In some cases where adjustments have been made to the engine fuel system and or turbocharger system a test flight will be required, Record all engine parameters on the operational test form and if a test flight was performed on a test flight log and verify that recorded parameters are within the specifications published for the engine and aircraft. The scheduled maintenance listings in this program are formatted in a convenient check list form that may be printed and used during the performance of the inspections.

Note: The "Maintenance Schedule" checklists contained in this program are intended to complement the Aircraft Manufacturer-s published recommendations. In addition to the items included in the pre-flight and 25 hour inspection, the following inspections and maintenance should be performed.

Note: It would be considered prudent to research the Service Bulletins and AD-s at this time. TCM requires that all Category I (Mandatory) and Category II (Critical) Service Bulletins be complied with in accordance with the "COMPLIANCE" section of the Service Bulletin. Category I and Category II Service Bulletins are issued to notify owners, operators and FBO-s of conditions that affect safety of flight and continued airworthiness.

___ 1. Perform pre-inspection operational check of the following items with the engine at normal operating temperatures. Reference the applicable Airplane Flight Manual for operational values.

___ A. Idle speed.

___ B. Idle mixture, set to achieve 25 to 50 RPM rise.

___ C. Magneto drop, and variation between magnetos. Maximum drop 150 RPM, maximum variation 50 RPM.

___ D. Hot magneto test. (See TCM Service Bulletin SB653 or latest revision for amplified instructions).

___ E. Propeller for proper operation.

___ F. Full power performance, R.P.M., Manifold Pressure and Fuel Flow.

___ G. Cylinder head and oil temperature within limits.

___ H. Oil pressure. Minimum 10 psi idle, 30 to 60 psi full power at normal oil temperature (175 to 200 degrees Fahrenheit).

___ 2. Drain engine oil. If using oil analysis, take oil sample in accordance with the analysis company-s instructions.

___ 3. Remove oil filter or integral oil pressure screen. Inspect filter element or screen for foreign material. Install new oil filter or clean and reinstall integral oil pressure screen with new gasket and safety. Service engine with proper grade of oil in accordance with the Airplane Flight Manual or latest revision of M87-12 Rev. 1. Note: To facilitate installation and removal of the oil filter, place a thin film of Dow Corning DC-4 compound on the filter gasket. Torque filter to values as directed by filter manufacturer.

___ 4. Inspect ignition leads for chaffing, deterioration and proper routing.

___ 5. Visually inspect magnetos for condition. Inspect, repair and adjust as required if magneto drop or split was not within published limits.

___ 6. Inspect exhaust system for leakage, deterioration, loose and missing brackets, clamps and hardware.

___ 7. Correct all discrepancies noted during pre-inspection operational run-up.

___ 8. Perform post inspection operational run-up. Verify that engine meets all performance criteria as detailed in Step 1, pre-inspection operational run-up and record engine parameters on operational check list. Visually inspect engine and nacelle for fuel and oil leaks.

___ 9. Correct any discrepancies noted during this inspection prior to returning engine to service.

OBSERVATIONS

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6 Visite des 100 heures

6.1.1 Entretien courant, graissage

Les charnières d'aileron et de volets doivent être lubrifié avec une huile fine possédant une propriété anticorrosion.

Les coulisse de commande de volet sont graissées à l'aide de graisse blonde.

6.1.2 Conditionnement d'air

Vérifier le fonctionnement des commandes de clapet, au besoin lubrifier les axes des clapets. Vérifier la fixation des gaines au raccordement.

6.1.3 Circuit électrique

Vérification du câblage électrique à l'avant de la cloison pare feu pour frottements et usure anormale. Vérifier le serrage des cosses électriques.

Vérifier la charge de la batterie, recharger éventuellement.

Vérifier le fonctionnement du phare d'atterrissage, des feux de navigation, des feux à éclat, de l'avertisseur de décrochage.

6.1.4 Circuit carburant

Nettoyage du pot décanteur, noter l'état, remontage : la molette de serrage du pot doit être arrêtée au fil à freiner (voir figure).

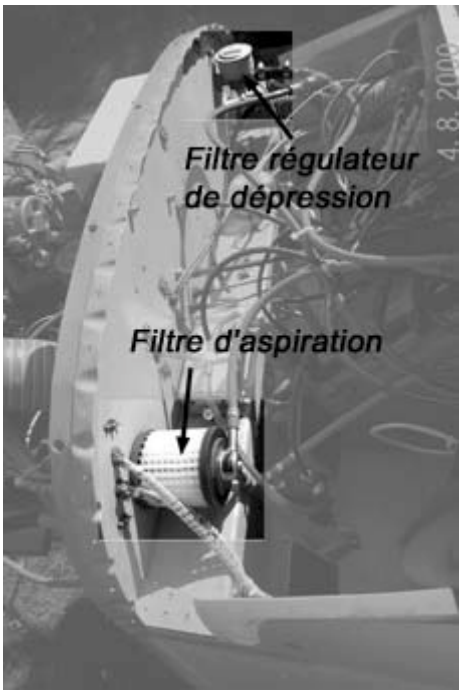
Vérifier les tuyaux souples pour péremption, frottements, rayon de courbure et usure anormale.

Vérification des filtres essence : péremption.

6.1.5 Système de freinage

Vérifier le circuit pour fuite et dommage.

Vérifier le niveau du liquide de frein. Compléter éventuellement avec du liquide de frein automobile DOT4 uniquement.



6.1.6 Instruments

Etat du circuit d'air déprimé, péremption des filtres. Pour localisation voir figure.

6.1.7 Commandes de vol

Démonter les trappes de visite (une sous chaque aile, deux sous le fuselage), vérifier l'état des guignols, des rotules : jeux, déformations.

Démontage des habillage de cabine, vérification du pied de manche, des rotules et fixation : graissage, jeux.

Passage de câble de gouverne de direction, jeux, usure des guides, rotule : graissage, jeux.

Rotule de gouverne de direction, graissage, jeux.

6.1.8 Hélice

Vérification visuelle des pales pour éclat.

Vérification du serrage de l'hélice :

Démontage du cône

Serrage des vis de ¼" au couple de 9 à 10 foots.lbs

Serrage des vis de ½ " au couple de 45 à 50 foots.lbs

Remontage du cône.

6.1.9 Moteur

Se conformer au « IO240 series Maintenance Manual » réf. TCM X30621A ou aux recommandations ci-dessous :

6.1.10 100 HOUR INSPECTION (Fuel Injected Normally Aspirated Engines)

SERVICING

SCHEDULED MAINTENANCE

Maximum efficiency and engine service life is predicated on compliance with the aircraft and engine manufacturer-s required published inspection and maintenance schedule. Non compliance mayresult in a loss of engine performance, an increase in unscheduled maintenance and a reduction in engine service life.

Prior to any scheduled inspection the engine must be clean and a pre-inspection operational run-up performed. Record the engine operating parameters on the operational test form provided. Verify that the recorded parameters meet the published performance specifications for the engine as provided in the aircraft and/or engine manufacturers- Service, Operator-s and Overhaul Manuals.

At the completion of any maintenance event the engine must be given a complete and thorough operational run-up. In some cases where adjustments have been made to the engine fuel system and or turbocharger system a test flight will be required, reference FAR 91.407. Record all engine parameters on the operational test form and if a test flight was performed on a test flight log and verify that recorded parameters are within the specifications published for the engine and aircraft.

The scheduled maintenance listings in this program are formatted in a convenient check list form that may be printed and used during the performance of the inspections.

Note: The "Maintenance Schedule" checklists contained in this program are intended to complement the Aircraft Manufacturer published recommendations.

In addition to the items listed for pre-flight, 25 and 50 hour inspections, the following inspections and maintenance must be performed.

Note: During the 100 hour inspection research all Service Bulletins and AD-s. TCM requires that all Category I (Mandatory) and Category II (Critical) Service Bulletins be complied with in accordance with the "COMPLIANCE" section of the Service Bulletin. Category I and Category II Service Bulletins are issued to notify owners, operators and FBO-s of conditions that affect safety of flight and continued airworthiness.

___ 1. Perform a pre-inspection operational ground run-up as detailed in the 50 hour inspection.

___ 2. Perform a cylinder compression test as detailed in TCM Service Bulletin M84-15 or latest revision. Record the cylinder compression readings. Any cylinder with compression reading below the low limit established using the " Master Orifice Tool " requires further inspection to determine the cause and corrective action needed to return the cylinder(s) to service.

___ 3. Inspect the entire engine, accessory section and nacelle for indications of fuel, oil or hydraulic leaks. Inspect all wiring, flammable fluid lines and hoses and electrical connections for proper routing, support and evidence of deterioration.

___ 4. Visually inspect the induction and exhaust system for leaks, cracks, deterioration, broken, missing or loose brackets, clamps and hardware.

___ 5. Visually inspect the cylinder barrels and cylinder heads for cracks and stains that may be associated with fuel or oil leaks. Inspect cooling fins for restrictions to cooling air flow.

___ 6. Inspect all inner cylinder and peripheral baffling for correct installation, proper positioning, deterioration and missing or broken sections.

Note: Engine service life will be negatively affected by incorrectly positioned, deteriorated or missing baffles.

___ 7. Check that magneto to engine timing is with-in published specifications. Reference TCM Service Bulletin SB94-8 or latest revision for magneto to engine timing

specifications. If not, prior to adjusting magneto timing inspect the breaker points for condition and signs of arcing. Replace breaker points and condenser if arcing signatures are noted.

Note: Magnetos using riveted type impulse coupling require repetitive 100 inspection. Refer to TCM Service Bulletin MSB645 or latest revision for specific instructions.

___ 8. Clean, inspect, gap and test all spark plugs. Rotate plugs as directed in the applicable Maintenance or Overhaul Manual to achieve maximum service life.

WARNING:

SPARK PLUGS THAT ARE EXCESSIVELY WORN AND CONTINUED IN SERVICE MAY CAUSE INTERNAL ARCING IN THE MAGNETOS.

___ 9. Check all fasteners for indications of improper assembly, loss of torque and obvious defects.

___ 10. Check all engine controls, control cables, control rod ends and levers for security, wear, improper assembly, routing and freedom of movement throughout the entire range of travel. Refer to TCM Service Bulletin SB95-2 or latest revision for detailed instructions on control linkage inspection and lubrication.

Note: Engine control rod ends should be fastened securely to the control lever. The rod end should move freely through the entire range of travel. Do not attempt to achieve freedom of movement or travel by loosening the torque on the attaching hardware. This will result in relative movement between the control lever attach point and the attaching hardware and will result in elongation of the attach point in the lever, loss of travel and possible failure of the lever.

WARNING:

ASSURE THAT THE FUEL SELECTOR IS IN THE "OFF" POSITION PRIOR TO REMOVING THE CARBURETOR BOWL DRAIN PLUG.

___ 11. Remove the fuel metering unit inlet screen and inspect screen for foreign material. Clean screen by soaking in lacquer thinner, acetone or methyl ethyl ketone (MEK). After the screen has been cleaned, reinstall screen in fuel control unit using a new gasket and safety.

___ 12. Inspect fuel nozzles and nozzle lines for proper routing and support. Inspect manifold valve for security of installation, proper venting and signs of fuel stains.

Note: Comply with TCM SB95-7 if fuel stains are noted at the manifold valve.

___ 13. At the first 100 hour inspection on new, rebuilt or overhauled engines remove and clean the fuel injection nozzles. Fuel nozzles must be cleaned at 300 hour intervals or more frequently if fuel stains are noted.

___ 14. Inspect all accessories for condition, security of mounting and proper operation. Refer to aircraft or component manufacturer-s Maintenance Manual for specifics.

___ 15. Inspect engine mount legs for cracks. Check engine mount biscuits for signs of deterioration, proper assembly and security.

___ 16. Correct any discrepancies noted.

___ 17. Perform post inspection operational run-up. Verify that engine meets all performance criteria as detailed in Step 1, 50 hour pre-inspection operational run-up and record engine parameters on operational check list. Visually inspect engine and nacelle for fuel and oil leaks.

___ 18. Correct any discrepancies noted during this inspection prior to returning engine to service.

OBSERVATIONS _____

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7 Matériels à péremption

La péremption peut venir d'une durée de réelle de fonctionnement ou d'une durée de vie calendaire. Les matériels doivent être changés dès la première occurrence d'une de ces deux durées.

Tuyaux souples	10 ans
Filtre à air moteur	1000 h
Filtre essence	200 h
Filtre de régulateur d'air déprimé	200 h
Filtre d'air déprimé	500 h

8 Annexes

ESSAIS MOTEUR AU SOL

ESSAIS MOTEUR AU SOL

Date :	Heure :	Effectué par :	Lieu :

Démarrer le moteur conformément au manuel de vol.

Pression d'huile : si la pression ne s'établis pas dans les 30 secondes, coupez le moteur et effectuer les vérifications nécessaires.

Attention : Attendre que la température d'huile atteigne 75°F et que le CHT atteigne 200°F pour tourner à plus de 1800 tr/mn.

Faire tourner le moteur à 2100 tr/mn

Pression carburant	PSI	
Chute RPM magnéto gauche	tr/mn	Max 150 tr/mn
Chute RPM magnéto droite	tr/mn	Max 150 tr/mn
Différence magnéto G/D	Tr/mn	Max 50 tr/mn

Mettre plein gaz

Pression d'admission	InchHg	
Pression injection carburant	PSI	11.2 ± 0.3 @ 2400 tr/mn
Pression d'huile	PSI	30 – 60 PSI (100 max)
Température d'huile	°F	<240°F
CHT	°F	<460°F
RPM	Tr/mn	≤ 2400

Réduire les gaz au ralenti

Vitesse de rotation ralenti	Tr/mn	850 ± 50 tr/mn
Pression d'injection	PSI	3.5 – 4 PSI
Pression d'huile	PSI	10 PSI min
Température d'huile	°F	-

Ne pas arrêter le moteur avant que la température de cylindre (CHT) ne soit au dessous de 300°F

Placer la richesse sur la position de test du régime de ralenti

Augmentation du nbre de tr/mn	Tr/mn	25 – 50 tr/mn
Coupure franche de l'alimentation		-

Magnéto sur Off, contact général sur Off, robinet de sélection réservoir sur Off.